

# Typhus

## 1. DISEASE REPORTING

### A. Purpose of Reporting and Surveillance

1. To educate potentially exposed persons about signs and symptoms of disease, thereby facilitating early diagnosis.
2. To educate people about how to reduce their risk of infection.
3. To determine the epidemiology of the disease in Washington State.

### B. Legal Reporting Requirements

1. Health care providers: **immediately notifiable to local health jurisdiction.**
2. Hospitals: **immediately notifiable to local health jurisdiction.**
3. Laboratories: no requirements for notification.
4. Local health jurisdictions: notifiable to Washington State Department of Health (DOH) Communicable Disease Epidemiology Section (CDES) within 7 days of case investigation completion or summary information required within 21 days. ***If bioterrorism is suspected, case must be immediately reported to DOH: 1-877-539-4344***

### C. Local Health Jurisdiction Investigation Responsibilities

1. Facilitate the transport of specimens to PHL for confirmatory testing.
2. Ensure that persons with louseborne typhus and their contacts are properly deloused.
3. Educate potentially exposed persons about signs and symptoms of disease.
4. Report all *probable* and *confirmed* cases to Communicable Disease Epidemiology Section (see definitions below). Complete the typhus report form (available at: [www.doh.wa.gov/notify/forms/typhus.doc](http://www.doh.wa.gov/notify/forms/typhus.doc)) and enter the data into the Public Health Issues Management System (PHIMS).

## 2. THE DISEASE AND ITS EPIDEMIOLOGY

### A. Etiologic Agent

*Rickettsia typhi* or *R. felis* is the etiologic agent for fleaborne (endemic or murine) typhus and *R. prowazekii* is the etiologic agent for louseborne (epidemic) typhus.

### B. Description of Illness

Louseborne typhus is a rickettsial disease characterized by fevers, chills, headache, prostration, and muscle aches. A rash appears on the fifth to sixth day, initially on the upper trunk, followed by spread to the entire body, but usually not to the face, palms or soles. Toxemia is usually pronounced, and the disease terminates by rapid defervescence after about 2 weeks of fever. The case-fatality rate increases with age and varies from 10% to 40% in the absence of specific therapy. Mild infections may occur without eruption, especially in children and people partially protected by prior immunization. Louseborne typhus was a devastating infection for populations living in crowded

conditions during both World War I and World War II, causing high morbidity and mortality.

Fleaborne or murine typhus resembles that of louseborne typhus, but symptoms are milder. The case-fatality rate for all ages is less than 1% although increasing with age.

### C. Typhus in Washington

The last reported case of typhus in a Washington resident occurred in 1994 following travel to Asia. Endemic typhus is rarely reported in the United State. Most reported cases occur in southern California, southern Texas, the southeastern Gulf Coast, and Hawaii.

### D. Vectors and Reservoirs

Fleaborne (endemic or murine) typhus is primarily maintained in nature by a rat to flea to rat cycle where rats are the reservoir (commonly *Rattus rattus* and *R. norvegicus*) and the flea vector usually *Xenopsylla cheopis*. Infection is inapparent in these rodents. Dogs, cats, mice, and opossum can also serve as a reservoir.

Humans are the reservoir and the body louse (*Pediculus humanus*) is the vector for louseborne typhus. Lice become infected after feeding on infected humans. In eastern United States, flying squirrels can be infected with *R. prowazekii* and serve as a reservoir for infection.

### E. Modes of Transmission

Fleaborne (murine) typhus is acquired when infective rat fleas (usually *X. cheopis*) defecate rickettsiae while sucking blood; this contaminates the bite site and other fresh skin wounds. In addition, the disease can be acquired by inhaling infected flea feces.

Louseborne typhus is acquired by rubbing louse feces or crushed infected lice into the bite or other fresh skin wounds.

### F. Incubation Period

The incubation period for both fleaborne and louseborne typhus is 7 to 14 days.

### G. Period of Communicability

Neither fleaborne or louseborne typhus is directly transmitted from person to person, but louse-borne typhus can be spread to close contacts by infected lice.

### H. Treatment

Doxycycline is the antibiotic of choice for treating typhus. In addition, patients with louseborne typhus should be deloused with a pediculicide.

## 3. CASE DEFINITIONS

### A. Clinical Criteria for Diagnosis

A febrile illness with temperature  $\geq 100.5^{\circ}\text{F}$  ( $38.0^{\circ}\text{C}$ ). A typical clinical presentation includes fever, chills, headache, myalgias, nausea, vomiting, and in 50%, a petechial or maculopapular rash. In the United States, typhus may be seen following travel to endemic areas, or after exposure to rodents fleas in risk areas.

**B. Laboratory Criteria for Diagnosis**

1. Fourfold rise in serum antibody titers to *Rickettsia* antigen, or
2. *Rickettsia* detected in a clinical specimen by polymerase chain reaction (PCR) assay, or
3. Identification of *Rickettsia* in tissue by immunohistochemical stain.

**C. Case Definition (DOH)**

1. Probable: A case with a typical clinical presentation, with no established alternative diagnosis, but with a single positive *Rickettsia* immunoglobulin M (IgM) or immunoglobulin G (IgG) titer.
2. Confirmed: A case that is laboratory confirmed, or a case that meets the clinical case definition and is not laboratory confirmed, but is epidemiologically linked to a confirmed case.

**4. DIAGNOSIS AND LABORATORY SERVICES****A. Diagnosis**

The diagnosis of typhus is most commonly confirmed by serologic testing.

**B. Services Available at the Washington State Public Health Laboratories (PHL)**

PHL does not perform serologic testing for typhus but will forward specimens to the CDC. Contact Communicable Disease Epidemiology Section for approval prior to submitting specimens.

**C. Specimen collection**

Acute and convalescent sera should be refrigerated and transported cold. Specimens should be submitted with a completed DOH PHL Serology form available at: <http://www.doh.wa.gov/EHSPHL/PHL/Forms/Serology.pdf>.

**5. ROUTINE CASE INVESTIGATION**

**Since typhus is an uncommon disease, call CDES to discuss the case investigation.**  
Interview the case and others who might provide pertinent information.

**A. Evaluate the Diagnosis**

Facilitate submission of laboratory specimens to Public Health Laboratories for confirmation. Since the diagnosis of typhus is rare in Washington, all positive laboratory results should be submitted to PHL for confirmation at CDC.

**B. Identify Potential Sources of Infection**

Ask the patient about flea or other insect bites, exposures to rodents or other animals, and travel in the two weeks prior to illness.

**C. Identify Potentially Exposed Persons**

Identify persons who shared the exposure with the case and educate them about symptoms of typhus to facilitate early diagnosis and treatment.

**D. Environmental Evaluation**

If the case was exposed in a public building, inspect the property for signs of rodent infestation.

## 6. CONTROLLING FURTHER SPREAD

### A. Infection Control Recommendations

1. Hospitalized patients should be cared for using standard precautions. In addition to standard precautions, contact precautions should be used for persons with louseborne typhus until they have been appropriately deloused.
2. Patients with louseborne typhus should be deloused. Clothing, bedding, towels, etc. should be washed in hot water.
3. Patients should be educated on how to prevent future exposures.

### B. Contact Management

Typhus is not directly spread from person to person, but louseborne typhus can be spread to close contacts indirectly by infected lice. Close contacts of persons with louseborne typhus should be deloused and observed for 14 days. Clothing, bedding, towels, etc. should be washed in hot water.

### C. Management of Other Exposed Persons

All persons who shared the exposure with the case should be educated about symptoms of typhus to facilitate early diagnosis.

### D. Environmental Measures

If the site of exposure is determined to be rodent-infested human habitation, provide the owner of the private property or the agency overseeing the public property with flea and rodent control information.

## 7. MANAGING SPECIAL SITUATIONS

Determine if the case is associated with or potentially associated with an outbreak.

If an outbreak is suspected, notify CDES immediately: 1-877-539-4344.

## 8. ROUTINE PREVENTION

### A. Immunization Recommendations: None

### B. Prevention Recommendations

Keep rodents, especially rats, away from human habitations.

## ACKNOWLEDGEMENTS

This document is a revision of the Washington State Guidelines for Notifiable Condition Reporting and Surveillance published in 2002 which were originally based on the Control of Communicable Diseases Manual (CCDM), 17<sup>th</sup> Edition; James Chin, Ed. APHA 2000. We would like to acknowledge the Oregon Department of Human Services for developing the format and select content of this document.

## UPDATES